

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

Attorney Docket (No.)	81230.058002
First Inventor: Darbee, et al.	
Title	Key Mover
Express Mail Label No.	E J118553815US

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 17]
(preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R&D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 133) [Total Sheets 7]
4. ☒ Oath or Declaration [Total Pages 3]
 - a. ☐ Newly executed (original or copy)
 - b. ☒ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
 - i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

*NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28)

Assistant Commissioner for Patents
ADDRESS TO: Box Patent Application
Washington, DC 20231

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy (identical to computer copy)
 - c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney
9. ☐ English translation Document (if applicable)
10. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
11. ☒ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
13. ☐ *Small Entity Statements ☒ Statement filed in prior application, Status still proper and desired (PTO/SB/09-12)
14. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. ☒ Other: Check in the amount of \$ 458.00

16. ☒ If a **CONTINUING APPLICATION**, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: 07/990,854Prior application information: Examiner Edwards Group/Art Unit: 2735

For **CONTINUATION** or **DIVISIONAL APPS** only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS☐ Customer Number or Bar Code Label ☐ Correspondence address below.
(Insert Customer No. or Attach bar code label here)

Name	Mark R. Galis				
Address	Alzheimer & Gray, 10 South Wacker Drive, Suite 4000				
City	Chicago	State	Illinois	Zip Code	60606
Country	U.S.A.	Telephone	312-715-4000	Fax	3127154800

Name (Print/Type)	John E. Hyatt	Registration No.	43,421
Signature	<i>John E. Hyatt</i>	Date:	9/29/99

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Darbee, et al.)	
)	
Serial No.:	Not Yet Assigned)	
)	
Filed:	Herewith)	Examiner: Not Yet Assigned
)	
Title:	Key Mover)	
)	Group Art Unit: 2735
)	
Docket No.:	81230.058002)	

TRANSMITTAL SHEET

BOX PATENT APPLICATION
 Assistant Commissioner for Patents
 Washington, D.C. 20231

Dear Sir:

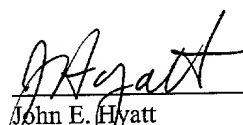
We are transmitting herewith the following:

- 1) This Transmittal Sheet;
- 2) Fee Transmittal in duplicate; and
- 3) Utility Patent Application Transmittal Sheet and elements and parts listed therein

Please charge any additional fees or credit overpayment to Deposit Account No. 011-156.

Respectfully submitted,

By:


 John E. Hyatt
 Reg. No. 43,421

ALTHEIMER & GRAY

10 South Wacker Drive, Suite 4000
 Chicago, Illinois 60606

Certificate Under 37 C.F.R. 1.10: The undersigned hereby certifies that this Transmittal Sheet and enclosures, as described hereinabove, is being deposited with the United States Postal Service as "Express Mail to Addressee" in an envelope addressed to Assistant Commissioner of Patents, BOX PATENT APPLICATION, Washington, D.C. 20231, on this 29 day of September 1999.

By:


 Name: John E. Hyatt

LABEL NO.: E J118553815US

Applicant or Patentee: Paul V. Darbee et al. Attorney's
 Serial or Patent No.: 07/990,854 Docket No.: 92032
 Filed or Issued: December 11, 1992
 For: KEY MOVER

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
 STATUS (37 CFR 1.9 (f) and 1.27 (c)) INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under Section 41 (a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled:

KEY MOVER

☐ the specification filed herewith
☒ application serial no. 07/990,854, filed December 11, 1992
☐ patent no. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9 (c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

☐ no such person, concern or organization
☒ persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

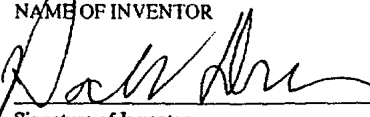
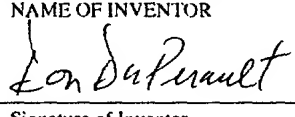
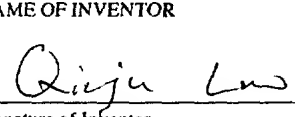
FULL NAME Universal Electronics Inc.
 ADDRESS 1920 Enterprise Parkway, Twinsburg, OH 44087
☐ INDIVIDUAL ☒ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

<u>Paul V. Darbee</u>	<u>Don G. DuPerault</u>	<u>Quiju Luo QIUJU LUO</u>
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
		
Signature of Inventor	Signature of Inventor	Signature of Inventor
<u>1-18-93</u>	<u>1-18-93</u>	<u>1-18-93</u>
Date	Date	Date

Applicant or Patentee: Paul V. Darbee et al. Attorney's
 Serial or Patent No.: 077990,854 Docket No.: 92032
 Filed or Issued: December 11, 1992
 For: KEY MOVER

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
 STATUS (37 CFR 1.9 (f) and 1.27 (c)) INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9 (c) for purposes of paying reduced fees under Section 41 (a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled:

KEY MOVER

- ☐ the specification filed herewith
☒ application serial no. 07/990,854, filed December 11, 1992
☐ patent no. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9 (c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☐ no such person, concern or organization
☒ persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

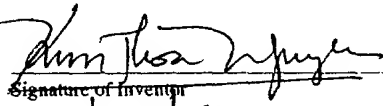
FULL NAME Universal Electronics Inc.
 ADDRESS 1920 Enterprise Parkway, Twinsburg, OH 44087
☐ INDIVIDUAL ☒ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____
 ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Kimthoa Nguyen
 NAME OF INVENTOR NAME OF INVENTOR NAME OF INVENTOR

 Signature of Inventor Signature of Inventor Signature of Inventor
01/18/93
 Date Date Date

Applicant or Patentee: Paul V. Darbee et al. Attorney's
Serial or Patent No.: 07/990,854 Docket No.: 92032
Filed or Issued: December 11, 1992
For: KEY MOVER

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9 (f) and 1.27 (e)) SMALL BUSINESS CONCERN

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Universal Electronics Inc.
ADDRESS OF CONCERN 1920 Enterprise Parkway
Twinsburg, OH 44087

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9 (d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled KEY MOVER

(by inventor(s))

described in

- ☐ the specification filed herewith
☒ application serial no. 07/990,854, filed December 11, 1992
☐ patent no. _____, issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9 (d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9 (d) or a nonprofit organization under 37 CFR 1.9 (e).

*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).

NAME _____

ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

NAME _____

ADDRESS _____
☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28 (b)).

I hereby declare that a. statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Thomas C. Tyler
TITLE OF PERSON OTHER THAN OWNER President
ADDRESS OF PERSON SIGNING 1920 Enterprise Parkway
Twinsburg, OH 44087

SIGNATURE [Signature]

DATE 11/13/92

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Darbee et al.)	
)	Examiner: UNKNOWN
Application No.:	UNKNOWN)	
)	
Filing Date:	Contemporaneously Herewith)	Group Art Unit: 2735
)	
Title:	Key Mover)	
)	
Attorney Docket No.:	81230.058002 US)	
)	
Assignee:	Universal Electronics, Inc.)	

PRELIMINARY REPLY

Assistant Commissioner of Patents
BOX PATENT APPLICATION
Washington, D.C. 20231

Dear Sir:

This is a Preliminary Reply to the continuation application filed herewith.

I. REMARKS

A. Claim Status

The parent application, Ser. No. 07/990,854, was filed with 11 claims; claims 12-19 were added during prosecution. Claims 1, 2, 6, and 11 were finally rejected; claims 3-5, 7-10, and 12-19 were allowed. The instant application is a continuation of the parent application and includes claims 1, 2, 6, and 11 of the parent application designated as claims 6, 7, 8, and 9, respectfully. Consideration of the instant application in light of the arguments submitted herein is respectfully

requested.

B. Claim Rejections - 35 U.S.C. § 102

Claims 6, 7, 8, and 9 (claims 1, 2, 6, and 11 of the parent application Ser. No. 07/990,854) were rejected under 35 U.S.C. §102 over *Evans et al.*

Applicant respectfully submits that the instant invention is not anticipated, nor obvious, over *Evans et al.* In paper 20 of the parent application history, the Examiner correctly points out that *Evans* does not recite “reassignment means” for reassigning instructions stored in memory. The Examiner also correctly notes that *Evans* teaches command functions associated with keys; further a sequence of commands may be executed by executing a sequence key, wherein the sequence of commands are programmed to the sequence key. The Examiner asserts that this sequence key “suggests” that *Evans* has a “means to reassign a different function to any key.” Applicant respectfully submits that the Examiner is mistaken on this later point.

Evans teaches use of a “preset key” sequence to execute a lengthy key sequence with fewer keystrokes. *Evans* teaches that the “user has complete discretion in determining the function to be performed by each key.” *Evans*, Col. 7, lines 40-42. However, *Evan*’s “complete discretion” is accomplished via a delete-re-entry process, rather than a reassignment means. *Evans* teaches that

[i]f at any time while entering codes for a device into [the remote] controller, the [Evan’s] user decides that he wishes to use a different key for the particular function than the key he has previously designated for such function, he may operate [the] delete key followed by the key for such function. This will cause the entry in RAM for such function to be deleted.

Evans, Col. 7, lines 50-57. (Emphasis added.) *Evans* then requires that the function "be re-entered in the system in the manner [discussed in *Evans*] and stored in conjunction with the new key." *Evans*, Col. 7, lines 58-60. *Evans* therefore teaches a "re-entry assignment" means. To assign data to a new key, the data must be entered into the remote control (i.e. from outside the remote control memory). Applicant's invention allows data already stored in memory to be reassigned to a new key (or assigned to a key if it was not already). This ability to "reassign" data is accomplished via elements which may be conveniently referred to as "reassignment means."

II. CONCLUSION

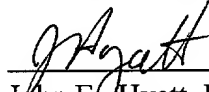
Applicant respectfully submits that the claims of instant application are patentable over the prior art of record. Further, a determination should not be influenced by an earlier conclusion. See *In re Eli Lilly & Co.*, 902 F.2d 943, 945, 14 USPQ2d 1741, 1743 (Fed. Cir. 1990); *Piasecki*, 745 F.2d at 1472-73, 223 USPQ at 788. Thus, Applicant respectfully requests consideration of the instant application in light of the above arguments.

Please charge any additional fees or credit any overpayments associated with the filing of this correspondence to Deposit Account No. 011,056.

Please call the undersigned attorney, if there are any further questions prior to examination.

Respectfully submitted,

By:



John E. Hyatt, Reg. No. 43,421
Alzheimer & Gray
10 South Wacker Drive, Suite 4000
Chicago, Illinois 60606-7482
(312) 715-4544

Date September 29, 1999

KEY MOVER

CROSS REFERENCE TO RELATED APPLICATIONS

5 This application is a Continuation of U.S. Patent Application Serial No. 07/990,854, filed December 11, 1992, which is a Continuation-in-Part of U.S. Patent Application Serial No. 07/913,523 filed July 14, 1992, which is abandoned and is a Continuation-in-Part of U.S. Patent Application Serial No. 07/586,957 filed September 24, 1990 which is abandoned and is a Continuation of U.S. Patent Application Serial No. 127,999 filed December 2, 1987 which issued to U.S. Patent No. 4,959,810 on September 25, 1990 which is a Continuation-in-Part of U.S. Patent Application Serial No. 109,336 filed October 14, 1987 which is abandoned.

FIELD OF THE INVENTION

10 The present invention relates to a remote control of the type which is hand held and which can be coupled via coded infrared signals with a remote control receiver built into a television or other remotely controlled electrical apparatus to turn on the apparatus, such as the television, at a distance, to adjust the volume, tone and brightness, to change channels, to turn the television off and to perform other functions, and more specifically to a remote control wherein functions can be moved or transferred to different keys or pushbuttons for the convenience of the user.

BACKGROUND OF THE INVENTION

Heretofore it has been proposed to provide a reconfigurable remote control device and programmable functions for such a remote control device which will enable one to learn, store and retransmit infrared codes that are emitted from the remote control device for a remotely controlled apparatus, such as a television.

For example, in the Welles II U.S. Patent No. 4,623,887 and the Ehlers U.S. Patent No. 4,626,848, there is disclosed a reconfigurable remote control device which has the ability to learn, store and repeat remote control codes from any other infrared transmitter. Such a reconfigurable remote control transmitter device includes an infrared receiver, a microprocessor, a non-volatile random access memory (RAM), a scratch pad random access memory, and an infrared transmitter.

According to the teachings of the Ehlers patent, the infrared signals received by the remote control device are in bursts of pulses and the device counts the number of pulses in each burst as well as the time duration of each pause in a transmission between bursts.

The Darbee et al U.S. Patent No. 4,959,810, of which this application is a Continuation-in-Part, discloses a universal remote control device having terminals for enabling code data to be supplied from outside the device through the terminals and a CPU to a RAM or ROM in the device.

Hand held remote controls of necessity have a finite number of keys and, because of the diversity of possible target devices, cannot offer a dedicated key for every possible function or feature.

Accordingly, dedicated keys are generally only provided for those functions which are common to almost all devices (e.g. Power, Volume, Channel Up/Down, etc.).

One approach to allowing a customer access to those special functions which are unique to his particular brand of remote control device (e.g. tracking or color adjustment, picture-in-picture, etc.) is to provide, in addition to the "standard" keys, a number of generic keys labeled, for example, A, B, C, D, etc. together with a booklet which lists, by brand and model, what functions are available on those keys as disclosed in the Darbee et al U.S. Patent No. 4,959,810.

The disadvantage of this method is that the number of keys is still quite limited, so the manufacturer of the universal remote control device usually has to select by brand and model which special functions are or are not offered.

Another approach is to provide a special key which, when pressed, allows a multi-key entry sequence to access any one of a large library of special functions. For example, pressing an "A" key followed by two digits (A-n-n) would provide access to up to 100 special, or "extended" functions. The disadvantage of this method is that it requires the user of the device to press the standard keys or pushbuttons multiple times in order to access any of these extended functions.

As will be described in greater detail hereinafter, the remote control device of the present invention overcomes the foregoing disadvantages by including, in the operating program for the remote control device, executable programs or routines which permit the individual user to assign any desired function to almost any key on the keypad. The user is thus able to individually customize his particular device so that his most frequently accessed functions are single keystrokes and/or in the most convenient locations on the keypad.

The executable routines or programs also allow the user to reassign keys "across devices". For example, if a user plays his TV sound through a stereo amplifier, he may wish to reassign the

"MUTE" key such that, when his remote control device is switched to TV mode, the mute signal sent in response to the button is that of the stereo amplifier, not that of the TV.

SUMMARY OF THE INVENTION

5 According to the present invention there is provided a remote control device comprising: a microprocessor including a CPU and a memory; a keypad including a set of keys coupled to the microprocessor; lamp driver circuitry coupled to the microprocessor; circuitry for generating IR signals coupled to the IR lamp driver circuitry; code data for executing command functions for a plurality of devices of different manufacturers stored in the memory; a Key Reassignment table in the memory containing key identity function data for those keys which have been reassigned by the user; and a program stored in the memory for reassigning a different function for the same or different device to a key on the keypad upon the inputting of a predetermined keystroke sequence on the keypad.

Further according to the present invention there is provided a method for reassigning a key function to a key on a keypad in a remote control device of the type described above comprising the steps of: entering a predetermined keystroke sequence on the keypad; determining if the predetermined keystroke sequence is a command to perform special function processing to reassign to a key a function of a device to be controlled; determining if a function key has been depressed; storing the key identity and current mode into a "FROM" entry in the Key Reassignment Table; 15 determining if the next key depressed is a mode key; setting the new mode; determining if a function sequence of keystrokes has been entered on the keypad for a valid function for the device and mode selected; obtaining device TYPE and command function data corresponding to the function and 20

mode selected from the Key Reassignment Table; and, storing the data in a "TO" entry in the Key Reassignment Table, thereby establishing a "FROM=TO" relationship between the physical key ("FROM") and the new, reassigned, function which it is to perform ("TO").

5

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a remote control device constructed according to the teachings of the present invention.

FIG. 2 is a front plan view of the control device shown in FIG. 1 and shows the various keys or pushbuttons of the device.

FIG. 3 is a block electrical schematic circuit diagram of the remote control device shown in FIGS. 1 and 2.

FIG. 4 is a flow chart of the steps performed by a key reassignment program entitled KEY MOVER: NORMAL FUNCTION.

FIG. 5 is a flow chart of the steps performed in the execution of a program for reassignment of a key function entitled KEY MOVER: KEY REASSIGNMENT.

FIG. 6 is a table showing the a Key Reassignment Table of the KEY MOVER program.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

Referring now to FIG. 1 in greater detail, there is illustrated therein a remote control device constructed according to the teachings of the present invention.

20

As shown, the device 10 includes a housing 11 including an upper housing member 12 having a base panel 14, and a lower housing member 16. An overlay face panel 18 is positioned over the base panel 14 and has a keyboard layout, i.e. keypad, 20 on the outer surface thereof.

The two panels 14 and 18 have openings therethrough for receiving elastomeric pushbuttons 25, for the keypad 20, all of which extend from and are fixed to or integral with an elastomeric body panel.

The pushbuttons 25 are arranged in rows and columns and are identified as follows on the keypad 20:

VCR	AUX	CABLE	TV
A	B	C	POWER
1	2	3	MUTE
4	5	6	
7	8	9	
	0		VOL
		ENTER	
		RECALL	CH
		PAUSE	PLAY
REC	*	TV-VCR	STOP

This arrangement is shown in FIG. 2, and the manner in which these pushbuttons 25 are utilized in operating the control device 10 will be described in greater detail hereinafter.

At a top or forward end of the device 10 there is provided an opening 30 for two light emitting diodes LED 1 and LED 2. The opening 30 is covered by an infrared-transparent lens 31.

Also provided on a top surface 32 of the upper housing member 12 of the control device 10 is a light emitting diode, LED 3, by which information is communicated to the user of the device 10.

FIG. 2 is a plan view of the keyboard or keypad 20 and shows the different keys or pushbuttons 25 of the control device 10 extending through the base panel 14 of upper housing member 12 and the face panel 18 where the label or identification for each pushbutton or key 25 is shown. The light emitting diode LED 3 is also indicated.

FIG. 3 is a block electrical schematic circuit diagram of the operating circuitry 36 in the remote control device 10 which includes a microprocessor 38, including a RAM 40, a ROM 42 and a CPU 44. The keypad 20 is coupled to the microprocessor 38 by an interrupt line 46 and a bus 48 to the CPU 44.

A power supply in the form of a battery 50 is connected between a + voltage input 51 to the microprocessor 38 and a system ground 52. A backup battery 56 is connected through a diode 58 to the + voltage input 51 to maintain the data stored in the memory 42 and/or 44 to provide a non-volatile system.

A reset circuit 60 is coupled to the microprocessor 38, as shown.

An output of the CPU 44 is connected to an IR lamp driver circuit 62 which outputs a voltage to the two light emitting diodes LED 1 and LED 2.

The status indicating LED 3 is connected to an input of the microprocessor 38.

The electrical circuitry 36 is generally of the type disclosed in greater detail in the Darbee et al U.S. Patent No. 4,959,810, the disclosure of which is incorporated herein by reference.

The operating program for the remote control device 10 which is stored in the ROM 42 or RAM 40 is very similar to the operating programs disclosed in the Darbee et al U.S. Patent No.

4,959,810, incorporated herein by reference, with the exception of the KEY MOVER routine or program described below, for moving or assigning a selected function to a selected key.

With reference to FIG. 4, in the normal operation of the KEY MOVER program, whenever a key is struck, the program determines whether or not it was the mode key and if it was then the mode of operation is changed.

If it was not, the program then determines whether it was the "A" key. If it was, a "Shift" status is set, enabling the program to "remember" during subsequent key presses that the "A" key had been struck.

If the answer is "No", the program then determines if the "B" key has been struck and the "Shift" status is in effect, and if the answer is "Yes", the program enters the special function processing mode for reassigning a key which is described in greater detail below and in connection with the description of FIG. 5.

This special function processing in the reassign mode of operation of the remote control device 10 allows the operator to reassign FUNCTION keys by typing on the keypad 20:

A-B-C-9-9-9 <From Func> <To Func>.

Thus, one can customize his/her keyboard or keypad 20.

If the user wants keys from a different mode (device) to replace existing keys, that can be done by typing on the keypad 20:

[From Mode] A-B-C-9-9-9 <From Func> [To Mode] <To Func>.

For example, if one wants Volume Up (VL+) from a CD to replace Volume Up for a TV, the user will type on the keypad 20:

TV A-B-C-9-9-9 VL+ CD VL+

Now, whenever the user is in the TV mode, pressing Volume Up will raise the volume on the CD player, not the TV. One can also make it so that the TV volume operates normally, but pressing keys:

A VL+

5 will operate the CD volume.

This is accomplished by typing on the keypad 20:

TV A-B-C-9-9-9 A VL+ CD VL+

A very desirable feature of the KEY MOVER program is that it allows one ready access to "extended" functions that would otherwise require several keystrokes. For example, if the remote control device 10 is of the type disclosed in U.S. Patent Application Serial No. 07/913,523 entitled: REMOTE CONTROL DEVICE WITH FUNCTION SYNTHESIS and where, to effect Color Up, one has to type on the keypad 20:

A-6-3-8,

one can move that function to the Channel Up key by typing:

TV A-B-C-9-9-9 A CH+ A-6-3-8.

Now, pressing CH+ will change channels on the TV normally, but pressing A CH+ will send Color Up.

One can assign alternate functions to any key except the mode (device) keys or the "A" key.

Returning to the program, if the pressing of the "B" key and setting of the "Shift" status have not occurred, the program then determines whether a DIGIT (number) key has been depressed and whether the "Shift" status is in effect.

If the answer is "Yes", extended function processing is performed such as synthesizing of an alternate or extended function in the manner described in U.S. Patent Application Serial No. 07/913,523 entitled: REMOTE CONTROL DEVICE WITH FUNCTION SYNTHESIS, the disclosure of which is incorporated herein by reference.

5 If the answer was "No" to the question of whether a DIGIT (number) key has been struck and "Shift" status is in effect, the program scans the "FROM" entries in a Key Reassignment Table for a match on key number, "Shift" status and mode. Then, a determination is made to see if a match has been found. If a match is found, then the device data format and command = data from the corresponding "TO" entry in the Key Reassignment Table is sent to the IR lamp driver circuit 62 and the IR code is transmitted based on that device data format and command data settings.

If no match was found, then the current mode's standard data for that key number and device data format is sent to the IR lamp driver circuit 62 to cause the IR code to be transmitted on the standard device ID and command data setting.

After the IR code is transmitted, as well as after the performance of the special function and the extended function (synthesis), the "Shift" status is cleared.

15 Stated in a simplified way, whenever a key is struck, the KEY MOVER routine or program illustrated in FIG. 4, after checking for the striking of special keys or functions, begins by scanning a special table, the Key Reassignment Table, in memory. This table is for all keys which have been reassigned. If a match is found, the program extracts from the second part of the table entry the
20 device data format and command information to be sent in lieu of the standard assigned function for that key and mode.

If no match is found, the standard device data format and command data are used.

The special KEY MOVER function program, protocol or subroutine is illustrated in FIG. 5 and starts with the detection of a key sequence, such as A-B-C-9-9-9.

Then, it is determined whether the next key pressed was "A".

If "Yes", then the "Shift" bit is set in the Key Reassignment Table and the program waits for the depression of another key.

Next, the program determines if a function key has been depressed. If "No", the program goes to exit.

If "Yes", the key number and current mode are stored into a "FROM" entry in the Key Reassignment Table (FIG. 6) and the program waits for the next key.

Next, a determination is made whether a mode key has been depressed. If "Yes", the new mode is set and the program waits for the next key stroke.

After that, or if the answer was "No", a determination is made if one or more keys have been depressed for a valid function sequence. If "No", the program exits.

If "Yes", the program obtains a device data format and command data corresponding to the function and mode selected and stores this data into a "TO" entry in the Key Reassignment Table which is illustrated in FIG. 6.

Whenever a special key sequence "A-B-C-9-9-9" is used, the operating program for the remote control device switches to the special function processing, KEY MOVER, program illustrated in FIG. 5, i.e. the "KEY MOVER" program as explained above and as indicated in the special function processing step of FIG. 4 and as further described in connection with the description of the flow chart in FIG. 5.

If a complete definition of the device data format requires more space than is provided for in the Key Reassignment Table shown in FIG. 6, the initial table entry under "DEVICE TYPE" simply may be a pointer to a secondary table, DEVICE DATA TABLE, containing additional information, as shown in FIG. 6.

5 From the foregoing description, it will be apparent that the KEY MOVER program of the present invention provides a number of advantages some of which have been described above and others of which are inherent in the invention. In particular, a dedicated or universal remote control device having the KEY MOVER program therein enables the user of the device to customize his particular device so that his most frequently accessed functions are single key strokes and/or in the most convenient location on the keypad 20. Also, the method of the present of the present invention, the Key Mover program, and operating keys (A-B-C-9-9-9) can be modified without departing from the teachings of the present invention. Accordingly, the scope of the invention is only to be limited as necessitated by the accompanying claims.

CLAIMS

What is claimed is:

1. A remote control comprising:

a memory;

a plurality of function instructions stored in the memory, including a first function instruction and a second function instruction;

a plurality of keys including a first key operably connected to execute the first function instruction; and

reassignment means for operably connecting the first key to execute the second function instruction instead of the first function.

2. A remote control comprising:

a memory;

a plurality of functions including a first function;

a plurality of keys including a first key and a user selected key, wherein the first key is connected to operate the first function; and

reassignment means including a Key Moving program in the memory for moving operation of the first function to the user selected key from the first key.

3. A remote control comprising:

a micro processor including a CPU and memory;

a plurality of executable programs stored in the memory, including a first executable program and a second executable program;

5 a plurality of keys including at least one key operably connected to execute the first executable program; and

reassignment means for reassigning the at least one key to be operably connected to execute the second executable program instead of the first executable program.

10 4. The remote control of claim 3, wherein the reassignment means comprises a Key Reassignment table in the memory, and wherein the Key Reassignment table contains key identity function data for keys which have been reassigned by a user.

15 5. The remote control of claim 3, wherein the reassignment means comprises a program stored in the memory for reassigning a different function to the at least one key upon inputting a predetermined keystroke sequence.

6. A remote control device comprising:

a microprocessor including a CPU and memory;

a keypad including a set of keys coupled to the microprocessor;

lamp driver circuitry coupled to the microprocessor;

means for generating IR signals coupled to the IR lamp driver circuitry;

instructions and data in binary form stored in the memory for enabling command functions for controlling a plurality of devices manufactured by different manufacturers, wherein the instructions and data are to be retrieved and supplied to the means for generating IR signals;

reassignment means for reassigning the instructions and data stored in memory associated with the command functions, wherein the reassignment means includes;

program instructions in binary form stored in the memory for enabling one to assign one of the command functions to a key on the keypad upon the inputting of a keystroke sequence on the keypad, wherein the instructions and data stored in memory associated with the one of the command functions is associated with the key.

7. The remote control device of claim 6 wherein the keypad includes device keys, mode keys and alpha-numeric keys.

8. The remote control device of claim 6 wherein the Key Reassignment Table includes, for each key, key identity mode data, device data format, and command function data.

9. A remote control device comprising:

a microprocessor including a CPU and memory;

means for generating IR signals defining IR command functions coupled to the microprocessor;

5 instructions and data in binary form stored in the memory for enabling IR command functions for controlling a plurality of devices manufactured by different manufacturers, wherein the instructions and data are to be retrieved and supplied to the means for generating IR signals;

code data for executing IR command functions stored in the memory; and

reassignment means for reassigning instructions and data associated with a key to another key, wherein the reassignment means includes program instructions in binary form stored in the memory for assigning a command function to a key selected by a user.

ABSTRACT

The invention teaches remote control device for reassigning functions associated with one key to another key, wherein the functions are stored in memory. In one embodiment the remote control comprises a memory and a plurality of function instructions stored in the memory, including a first function instruction and a second function instruction. A plurality of keys, including a first key, is operably connected to execute the first function instruction. Reassignment programming is stored in memory and provides for connecting the first key such that it will execute the second function instruction instead of the first function.

50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400
401
402
403
404
405
406
407
408
409
410
411
412
413
414
415
416
417
418
419
420
421
422
423
424
425
426
427
428
429
430
431
432
433
434
435
436
437
438
439
440
441
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466
467
468
469
470
471
472
473
474
475
476
477
478
479
480
481
482
483
484
485
486
487
488
489
490
491
492
493
494
495
496
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
512
513
514
515
516
517
518
519
520
521
522
523
524
525
526
527
528
529
530
531
532
533
534
535
536
537
538
539
540
541
542
543
544
545
546
547
548
549
550
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
567
568
569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624
625
626
627
628
629
630
631
632
633
634
635
636
637
638
639
640
641
642
643
644
645
646
647
648
649
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685
686
687
688
689
690
691
692
693
694
695
696
697
698
699
700
701
702
703
704
705
706
707
708
709
710
711
712
713
714
715
716
717
718
719
720
721
722
723
724
725
726
727
728
729
730
731
732
733
734
735
736
737
738
739
740
741
742
743
744
745
746
747
748
749
750
751
752
753
754
755
756
757
758
759
760
761
762
763
764
765
766
767
768
769
770
771
772
773
774
775
776
777
778
779
780
781
782
783
784
785
786
787
788
789
790
791
792
793
794
795
796
797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843
844
845
846
847
848
849
850
851
852
853
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
890
891
892
893
894
895
896
897
898
899
900
901
902
903
904
905
906
907
908
909
910
911
912
913
914
915
916
917
918
919
920
921
922
923
924
925
926
927
928
929
930
931
932
933
934
935
936
937
938
939
940
941
942
943
944
945
946
947
948
949
950
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000
1001
1002
1003
1004
1005
1006
1007
1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
1027
1028
1029
1030
1031
1032
1033
1034
1035
1036
1037
1038
1039
1040
1041
1042
1043
1044
1045
1046
1047
1048
1049
1050
1051
1052
1053
1054
1055
1056
1057
1058
1059
1060
1061
1062
1063
1064
1065
1066
1067
1068
1069
1070
1071
1072
1073
1074
1075
1076
1077
1078
1079
1080
1081
1082
1083
1084
1085
1086
1087
1088
1089
1090
1091
1092
1093
1094
1095
1096
1097
1098
1099
1100
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
1114
1115
1116
1117
1118
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128
1129
1130
1131
1132
1133
1134
1135
1136
1137
1138
1139
1140
1141
1142
1143
1144
1145
1146
1147
1148
1149
1150
1151
1152
1153
1154
1155
1156
1157
1158
1159
1160
1161
1162
1163
1164
1165
1166
1167
1168
1169
1170
1171
1172
1173
1174
1175
1176
1177
1178
1179
1180
1181
1182
1183
1184
1185
1186
1187
1188
1189
1190
1191
1192
1193
1194
1195
1196
1197
1198
1199
1200
1201
1202
1203
1204
1205
1206
1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230
1231
1232
1233
1234
1235
1236
1237
1238
1239
1240
1241
1242
1243
1244
1245
1246
1247
1248
1249
1250
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1270
1271
1272
1273
1274
1275
1276
1277
1278
1279
1280
1281
1282
1283
1284
1285
1286
1287
1288
1289
1290
1291
1292
1293
1294
1295
1296
1297
1298
1299
1300
1301
1302
1303
1304
1305
1306
1307
1308
1309
1310
1311
1312
1313
1314
1315
1316
1317
1318
1319
1320
1321
1322
1323
1324
1325
1326
1327
1328
1329
1330
1331
1332
1333
1334
1335
1336
1337
1338
1339
1340
1341
1342
1343
1344
1345
1346
1347
1348
1349
1350
1351
1352
1353
1354
1355
1356
1357
1358
1359
1360
1361
1362
1363
1364
1365
1366
1367
1368
1369
1370
1371
1372
1373
1374
1375
1376
1377
1378
1379
1380
1381
1382
1383
1384
1385
1386
1387
1388
1389
1390
1391
1392
1393
1394
1395
1396
1397
1398
1399
1400
1401
1402
1403
1404
1405
1406
1407
1408
1409
1410
1411
1412
1413
1414
1415
1416
1417
1418
1419
1420
1421
1422
1423
1424
1425
1426
1427
1428
1429
1430
1431
1432
1433
1434
1435
1436
1437
1438
1439
1440
1441
1442
1443
1444
1445
1446
1447
1448
1449
1450
1451
1452
1453
1454
1455
1456
1457
1458
1459
1460
1461
1462
1463
1464
1465
1466
1467
1468
1469
1470
1471
1472
1473
1474
1475
1476
1477
1478
1479
1480
1481
1482
1483
1484
1485
1486
1487
1488
1489
1490
1491
1492
1493
1494
1495
1496
1497
1498
1499
1500
1501
1502
1503
1504
1505
1506
1507
1508
1509
1510
1511
1512
1513
1514
1515
1516
1517
1518
1519
1520
1521
1522
1523
1524
1525
1526
1527
1528
1529
1530
1531
1532
1533
1534
1535
1536
1537
1538
1539
1540
1541
1542
1543
1544
1545
1546
1547
1548
1549
1550
1551
1552
1553
1554
1555
1556
1557
1558
1559
1560
1561
1562
1563
1564
1565
1566
1567
1568
1569
1570
1571
1572
1573
1574
1575
1576
1577
1578
1579
1580
1581
1582
1583
1584
1585
1586
1587
1588
1589
1590
1591
1592
1593
1594
1595
1596
1597
1598
1599
1600
1601
1602
1603
1604
1605
1606
1607
1608
1609
1610
1611
1612
1613
1614
1615
1616
1617
1618
1619
1620
1621
1622
1623
1624
1625
1626
1627
1628
1629
1630
1631
1632
1633
1634
1635
1636
1637
1638
1639
1640
1641
1642
1643
1644
1645
1646
1647
1648
1649
1650
1651
1652
1653
1654
1655
1656
1657
1658
1659
1660
1661
1662
1663
1664
1665
1666
1667
1668
1669
1670
1671
1672
1673
1674
1675
1676
1677
1678
1679
1680
1681
1682
1683
1684
1685
1686
1687
1688
1689
1690
1691
1692
1693
1694
1695
1696
1697
1698
1699
1700
1701
1702
1703
1704
1705
1706
1707
1708
1709
1710
1711
1712
1713
1714
1715
1716
1717
1718
1719
1720
1721
1722
1723
1724
1725
1726
1727
1728
1729
1730
1731
1732
1733
1734
1735
1736
1737
1738
1739
1740
1741
1742
1743
1744
1745
1746
1747
1748
1749
1750
1751
1752
1753
1754
1755
1756
1757
1758
1759
1760
1761
1762
1763
1764
1765
1766
1767
1768
1769
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1780
1781
1782
1783
1784
1785
1786
1787
1788
1789
1790
1791
1792
1793
1794
1795
1796
1797
1798
1799
1800
1801
1802
1803
1804
1805
1806
1807
1808
1809
1810
1811
1812
1813
1814
1815
1816
1817
1818
1819
1820
1821
1822
1823
1824
1825
1826
1827
1828
1829
1830
1831
1832
1833
1834
1835
1836
1837
1838
1839
1840
1841
1842
1843
1844
1845
1846
1847
1848
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858
1859
1860
1861
1862
1863
1864
1865
1866
1867
1868
1869
1870
1871
1872
1873
1874
1875
1876
1877
1878
1879
1880
1881
1882
1883
1884
1885
1886
1887
1888
1889
1890
1891
1892
1893
1894
1895
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1911
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
1936
1937
1938
1939
1940
1941
1942
1943
1944
1945
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
2069
2070
2071
2072
2073
2074
2075
2076
2077
2078
2079
2080
2081
2082
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
2097
2098
2099
2100
2101
2102
2103
2104
2105
2106
2107
2108
2109
2110
2111
2112
2113
2114
2115
2116
2117
2118
2119
2120
2121
2122
2123
2124
2125
2126
2127
2128
2129
2130
2131
2132
2133
2134
2135
2136
2137
2138
2139
2140
2141
2142
2143
2144
2145
2146
2147
2148
2149
2150
2151
2152
2153
2154
2155
2156
2157
2158
2159
2160
2161
2162
2163
2164
2165
2166
2167
2168
2169
2170
2171
2172
2173
2174
2175
2176
2177
2178
2179
2180
2181
2182
2183
2184
2185
2186
2187
2188
2189
2190
2191
2192
2193
2194
2195
2196
2197
2198
2199
2200
2201
2202
2203
2204
2205
2206
2207
2208
2209
2210
2211
2212
2213
2214
2215
2216
2217
2218
2219
2220
2221
2222
2223
2224
2225
2226
2227
2228
2229
2230
2231
2232
2233
2234
2235
2236
2237
2238
2239
2240
2241
2242
2243
2244
2245
2246

FIG.1

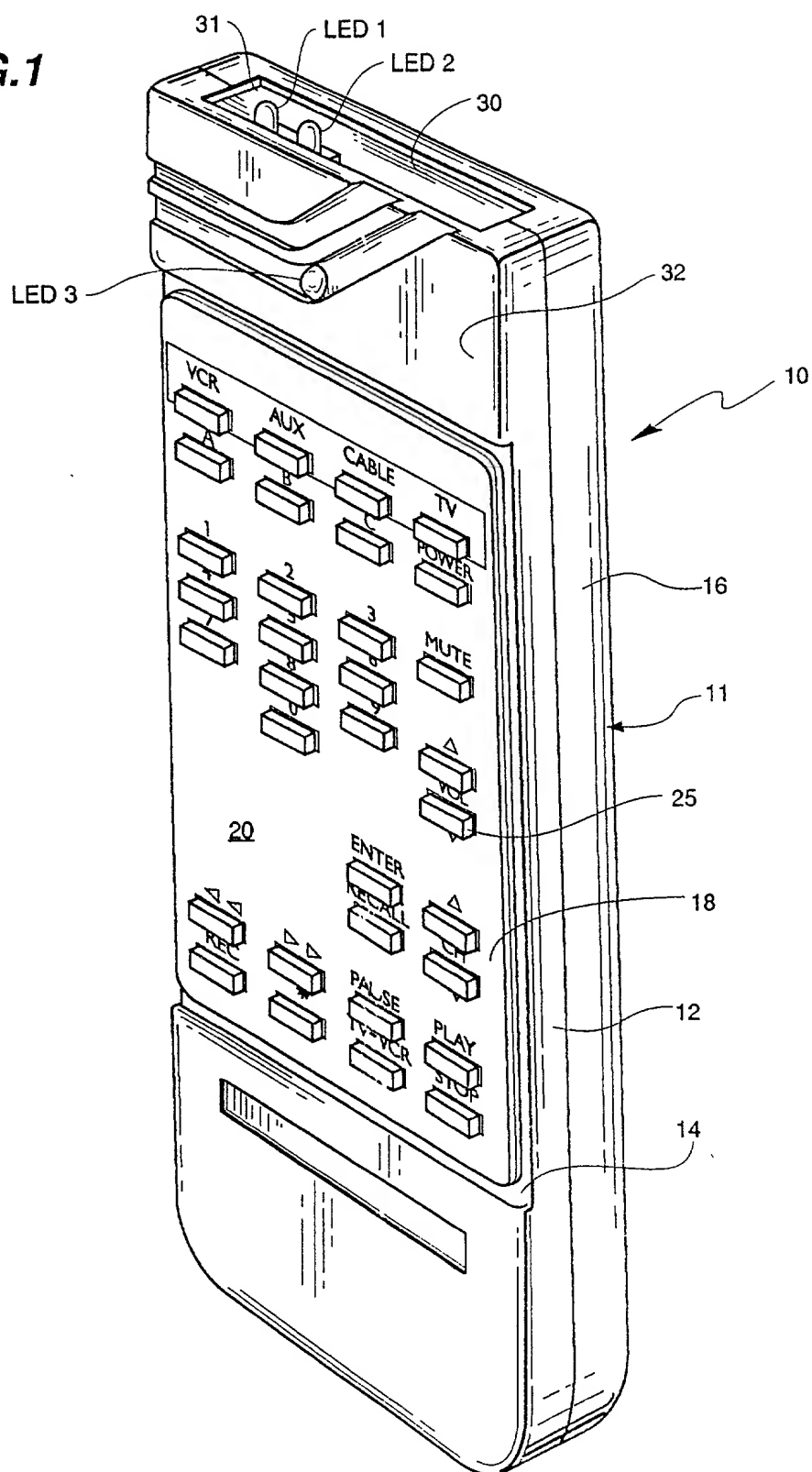


FIG.2

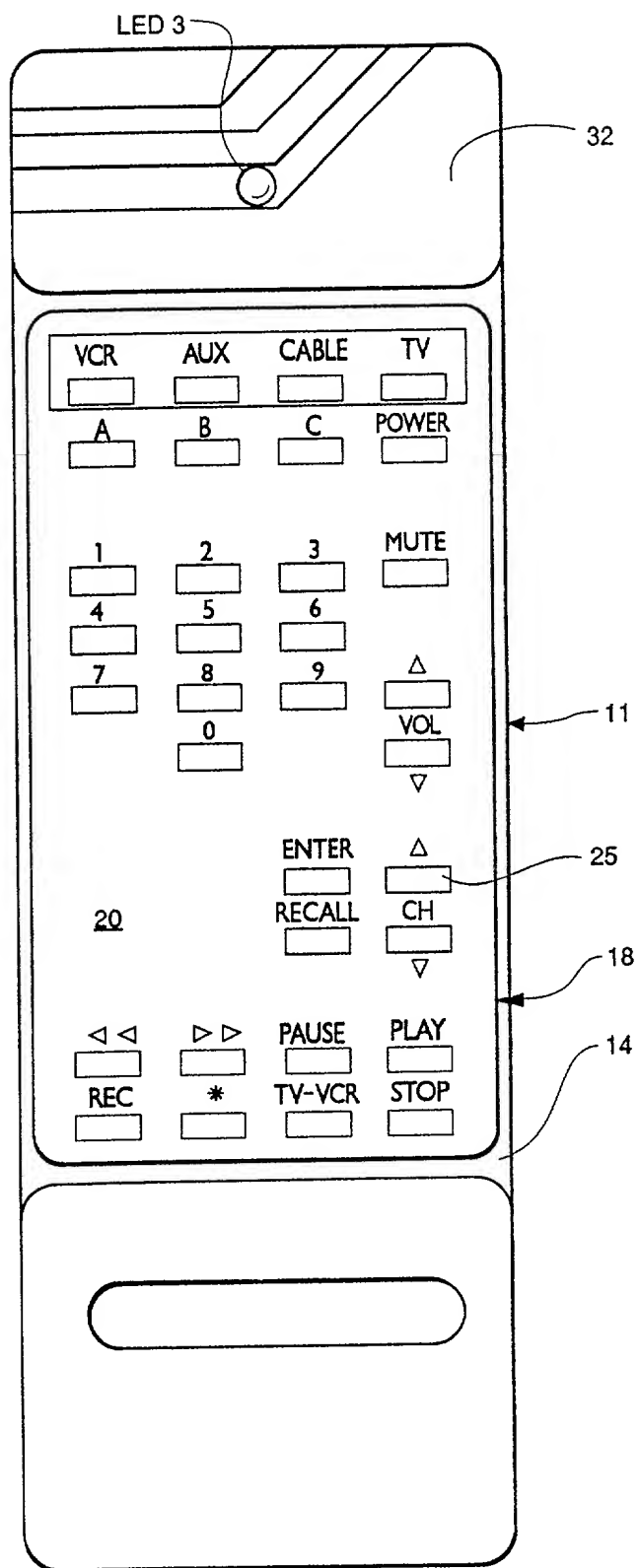


FIG. 3

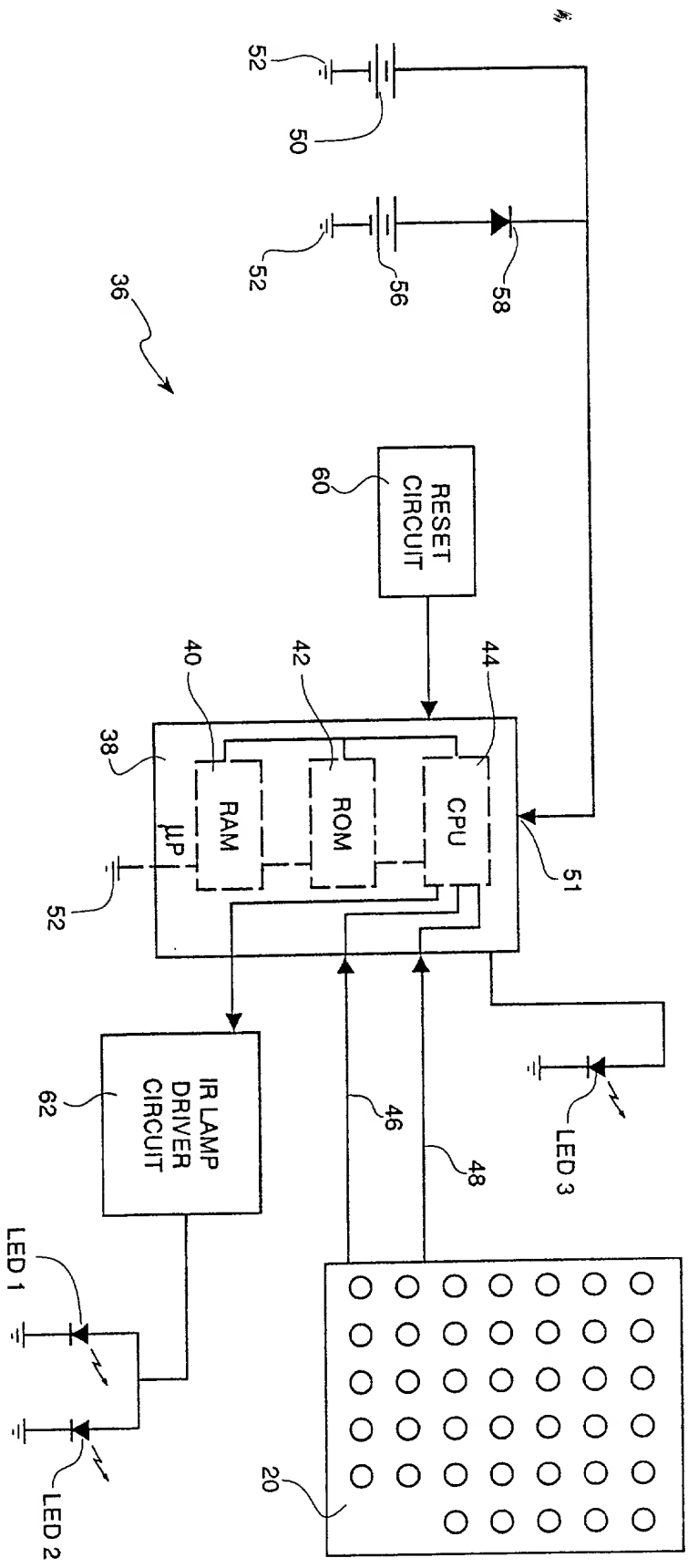


FIG. 4

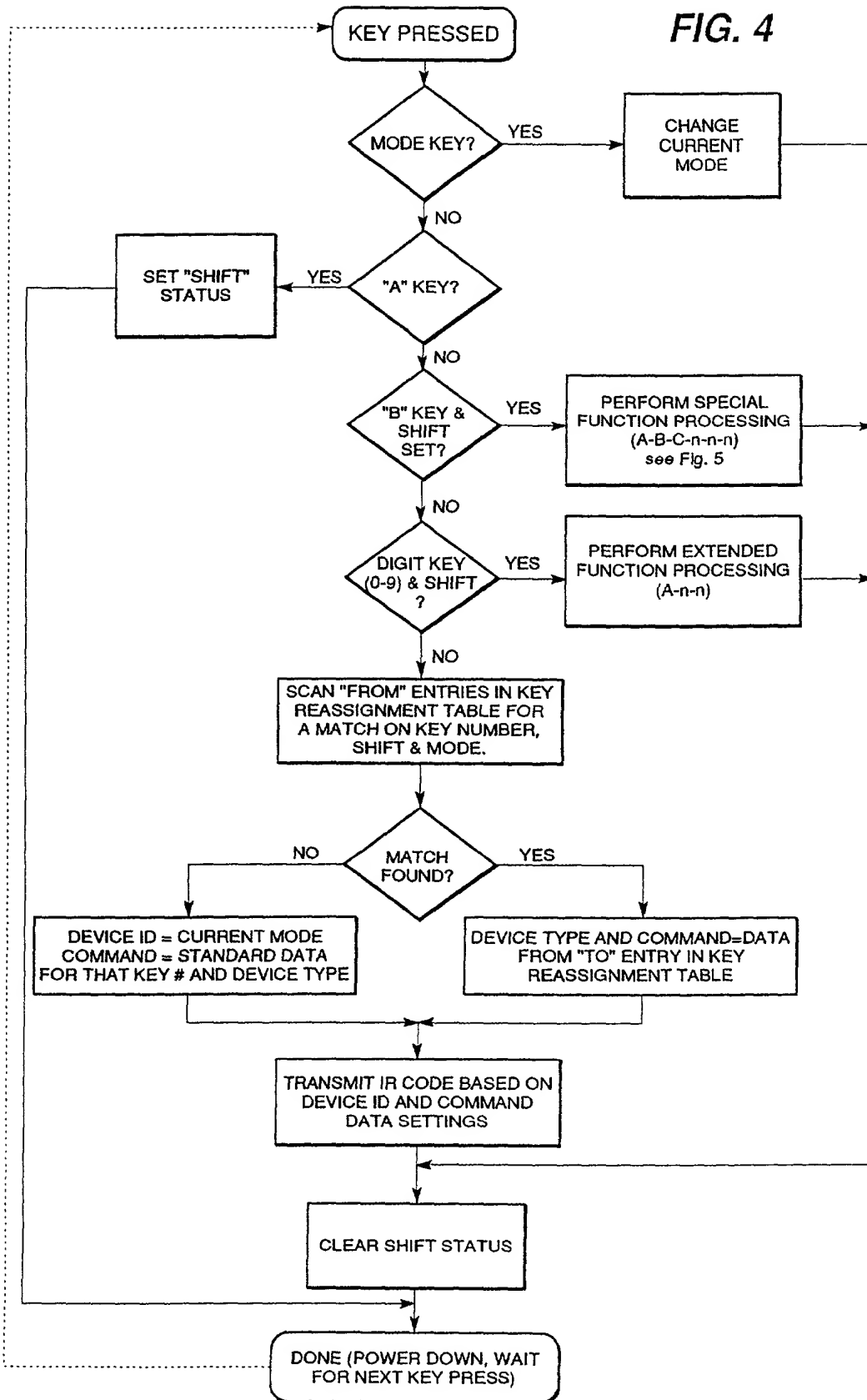
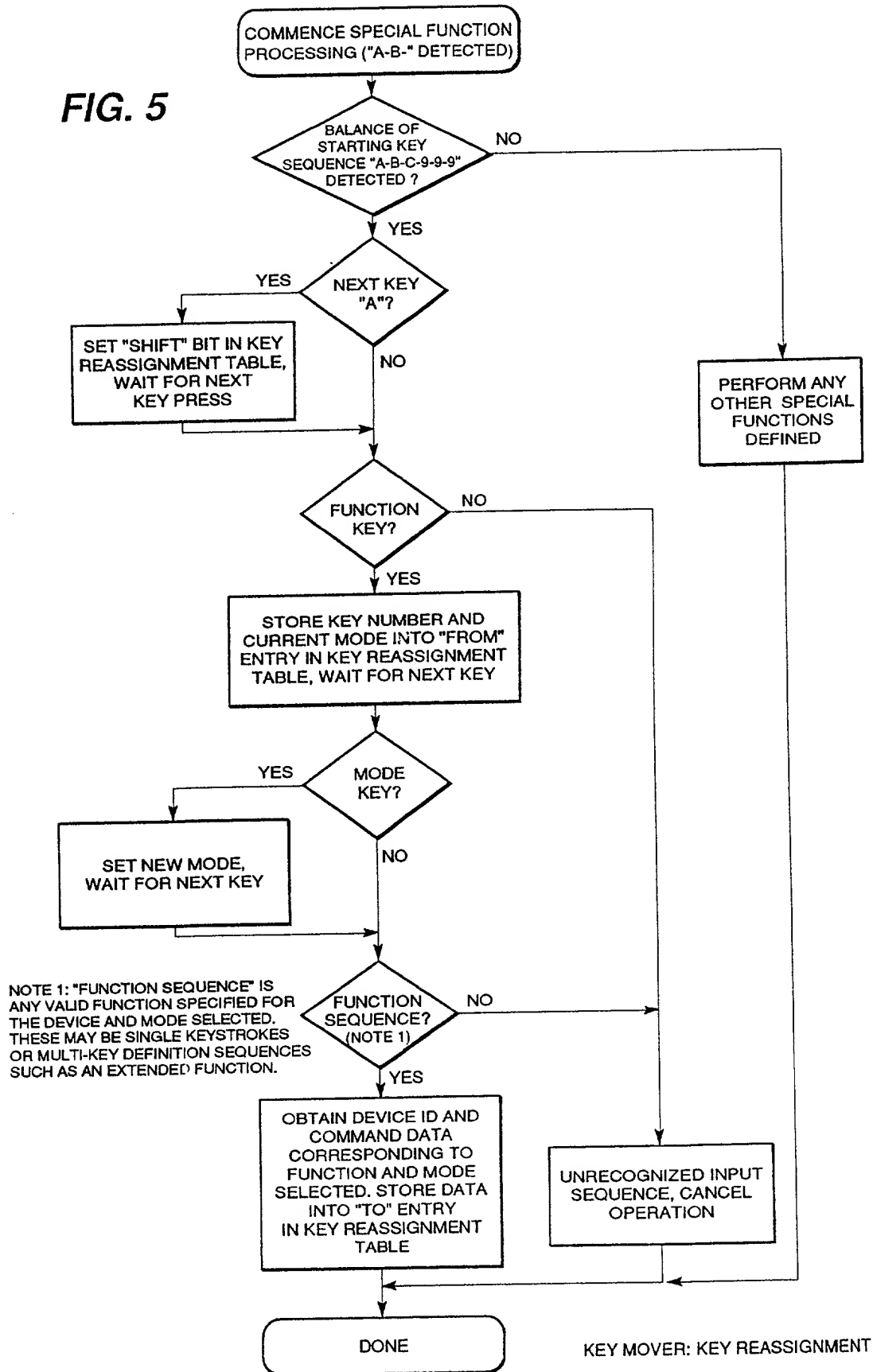
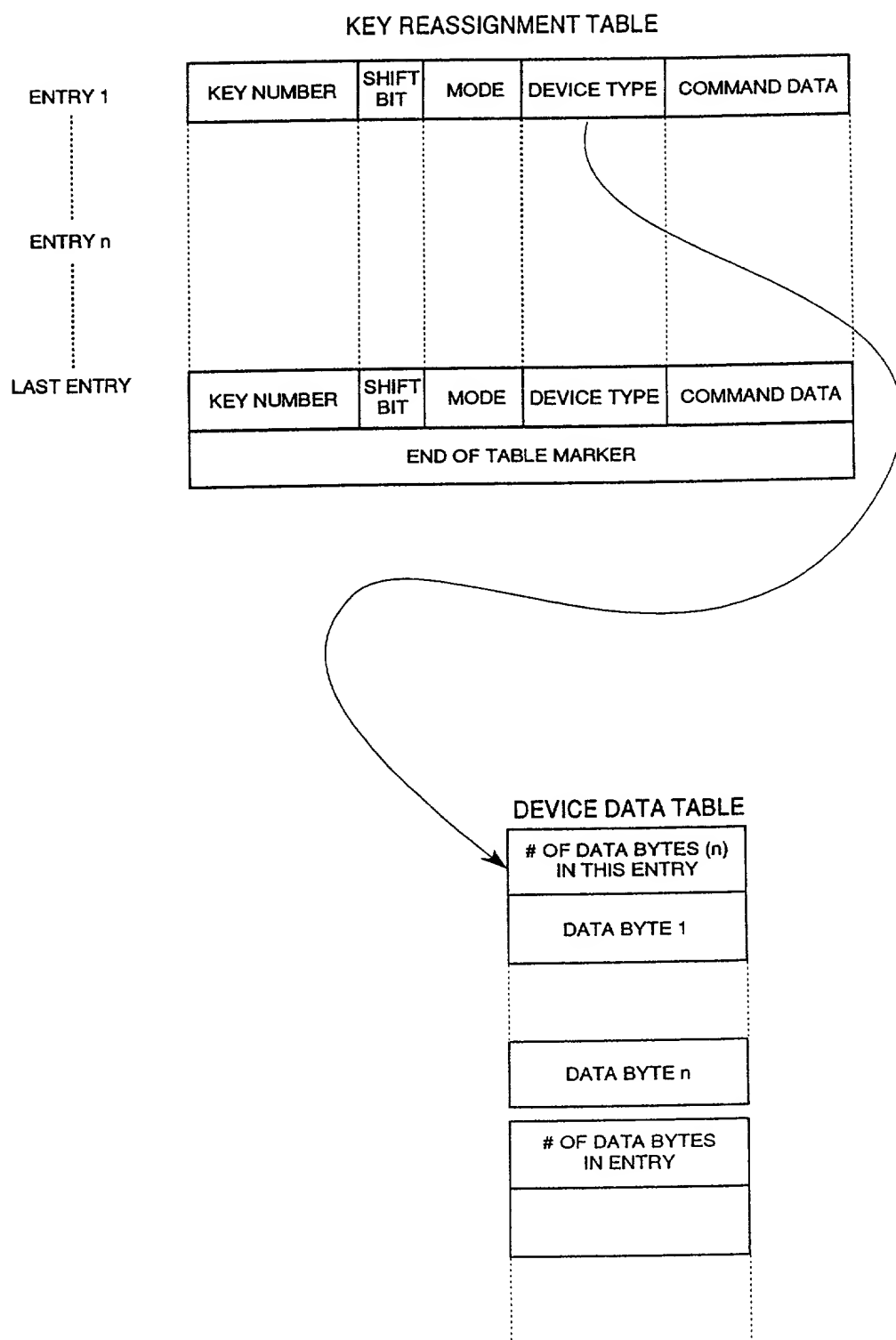
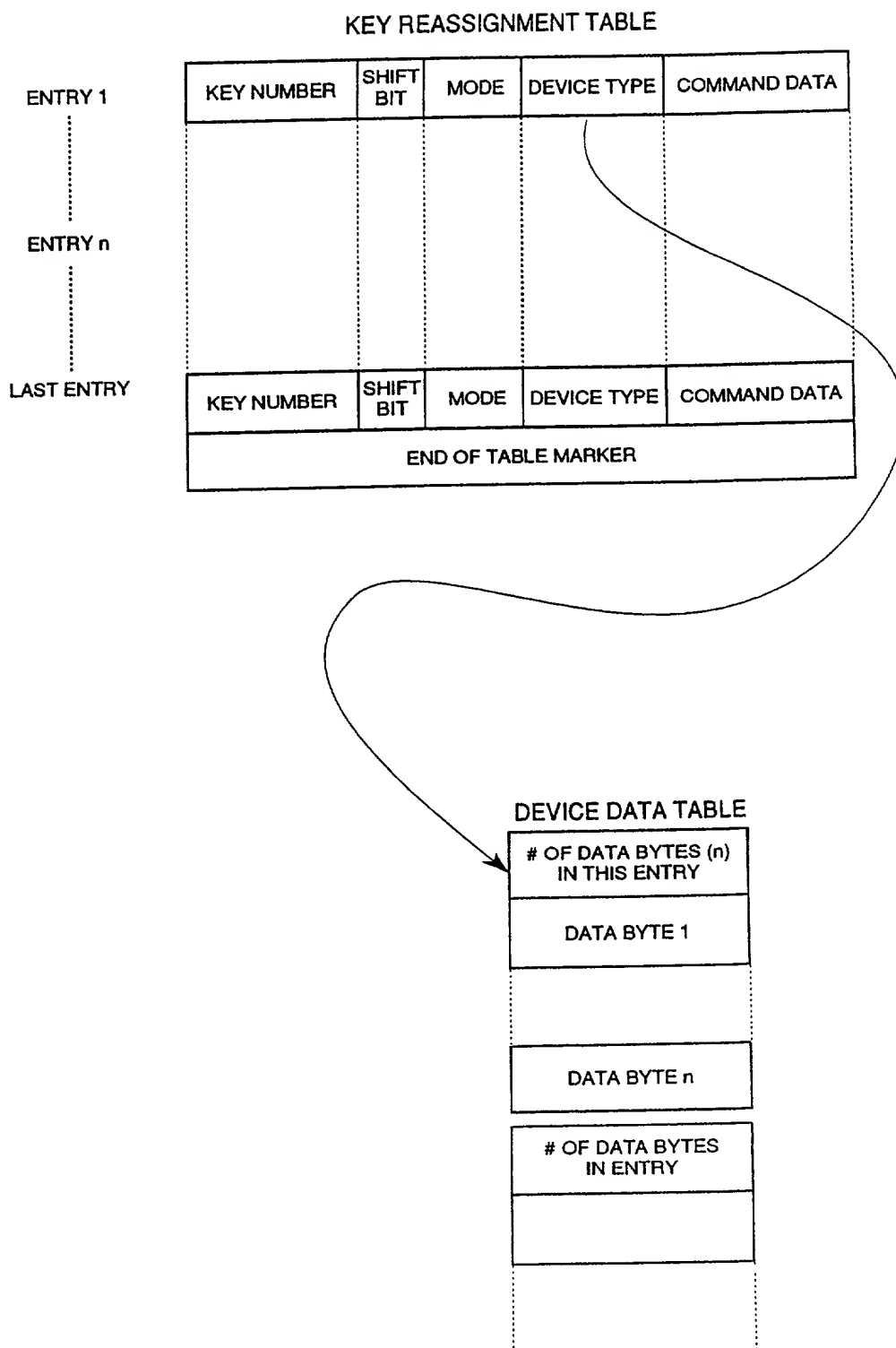


FIG. 5



[illegible]

[illegible]

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

92032

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

KEY MOVER

the specification of which (check only one item below):

- ☐ is attached hereto.
- ☒ was filed as United States application

Serial No. 07/990,854

on December 11, 1992

and was amended

on (if applicable)

- ☐ was filed as PCT international application

Number

on

and was amended under PCT Article 19

on (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby authorize the U.S. attorney or agent named herein to accept and follow instructions from

as to any action taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119	
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO
			<input type="checkbox"/> YES	<input type="checkbox"/> NO

Combined Declaration For Patent Application and Power of Attorney (Continued)

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

92032

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
07/913,523	July 14, 1992		X	
07/586,957	September 24, 1990		X	
127,999	December 2, 1987	X		
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NUMBER	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Thomas R. Vigil, Reg. No. 24,542
Gary J. Cunningham, Reg. No. 33,488

James P. Hanrath, Reg. No. 31,965
Charles W. Ryan, Reg. No. 28,110

Send Correspondence to:

Vigil & Hanrath
836 South Northwest Highway
Barrington, Illinois 60010

Direct Telephone Calls to:
(name and telephone number)

(708) 382-6500

201	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
		Darbee	Paul	V.
		Santa Ana	California	U.S.A.
		9852 Brentwood	Santa Ana	CA 92705 U.S.A.
202	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
		DuPerault	Don	G.
		Chino	California	U.S.A.
		5444 Choctaw	Chino	CA 91710 U.S.A.
203	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY	
		Luo	Qiuju	-----
		Orange	California	China
		8440 E. Hillsdale Dr.	Orange	CA 92669

I hereby declare under penalty of perjury under the laws of the United States of America that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
DATE 12-14-92	DATE 12-14-92	DATE 12-14-92

Combined Declaration For Patent Application and Power of Attorney (Continued)

(Includes Reference to PCT International Applications)

ATTORNEY DOCKET NUMBER

92032 (continued)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
109,336	October 14, 1987			X
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NUMBER	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)		

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Thomas R. Vigil, Reg. No. 24,542
Gary J. Cunningham, Reg. No. 33,488

James P. Hanrath, Reg. No. 31,965
Charles W. Ryan, Reg. No. 28,110

Send Correspondence to:

Vigil & Hanrath
836 South Northwest Highway
Barrington, Illinois 60010

Direct Telephone Calls to:
(name and telephone number)

(708) 382-6500

FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	Nguyen	Kimthoa	T.
RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	Yorba Linda	California	U.S.A.
STATE & ZIP CODE/COUNTRY			

CALIFORNIA

STATE OF CALIFORNIA)
COUNTY OF ORANGE)

ss.

On December 14, 1992, before me the undersigned, a Notary Public for the State of California, personally appeared Paul Darbee, Quiju Luu, Kimthoa Nguyen, Donald Gene Supercourt proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument, and acknowledged that he executed it.

WITNESS my hand and official seal.

Diane L Marcroft
Notary Public

